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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/991,820	11/26/2001	Katsuya Nagayama	50212-313	6026

7590 11/19/2003

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EXAMINER	
HUG, ERIC J	

ART UNIT	PAPER NUMBER
1731	

DATE MAILED: 11/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/991,820	NAGAYAMA ET AL.	
	Examiner	Art Unit	
	Eric Hug	1731	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 November 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 November 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Specification

The disclosure is objected to because of the following informalities:

In the first paragraph under Example 2 (starting on page 25), it states that the drawing rate was 8 m/s, which is inconsistent with the rate of 4 m/s given in Figure 2.

The third paragraph under Comparative Example 3 (starting on page 28) is also objected to, because it compares the results of Example 2, a Ge-containing single mode optical fiber, with results of Comparative Examples 1 and 2, a fluorine-doped silica glass optical fiber. In the last sentence, it states that the transmission loss of the Ge-containing fiber is reduced. Without a second example or Comparative Example of a Ge-containing fiber, the examiner does not see how the Applicant has come to this conclusion.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

1. Claims 9, 11, and 13 are rejected under 35 U.S.C. 102(a) as being anticipated by Okubo et al (JP 2000-128566). Okubo discloses drawing an optical fiber from a glass preform in a drawing furnace supplied with helium, and thereafter introducing the fiber into a cooling pipe at

the outlet of the drawing furnace, with argon fed to the cooling pipe. The helium gas is removed from the furnace at an exhaust port at the top of the drawing furnace. Argon (which has a lower thermal conductivity than helium) is supplied to the cooling tube just below the location where the helium is supplied to the drawing furnace (thus, helium flows upwards, argon flows downwards in this configuration). The temperature of the fiber when introduced to the argon atmosphere is between 900-1300 degrees C, which overlaps the claimed range. There appears to be a gap between the drawing furnace and the cooling tube where the two gases are added. Since the fiber is disposed continuously between the drawing furnace and the cooling tube, it is conceivable that there is some mixture of the two gases in the area between the drawing furnace and the cooling tube.

The examiner is relying on a machine translation of this document, which has been provided with this office action.

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Der Giessen et al (US 4,673,427) in view of Okubo et al (JP 11-116264, machine translation provided) or Okubo et al (JP 2000-128566).

Van Der Giessen discloses a device for drawing an optical fiber before coating with a synthetic resin. The drawn fiber is guided through a laminar gas flow vessel to restrict the temperature drop of the fiber during cooling. In drawing furnace 6, gas is fed at inlet 3 and flows downwardly around the perform and out of the furnace as indicated by the arrows in the Figure. Near the exit end of the drawing furnace, the drawn fiber passes through cylindrical body 9 which is provided with a flow of gas at inlet 10. The gas flows out of the cylindrical body as indicated by the arrows in the Figure. The gas can be nitrogen, argon, or oxygen, with argon given as a specific example for both gas flows. The drawing furnace is at a temperature of 2100 degrees C. The interior of the cylindrical body is at a temperature of 1650 degrees C.

Van Der Giessen discloses the claimed drawing furnace having a temperature within the claimed drawing temperature range, and also discloses the claimed heating furnace (cylindrical body) having a temperature within the claimed heating furnace temperature range. Van Der Giessen also discloses an outlet for gas flow out of the drawing furnace that is located between the drawing furnace and cylindrical body, a space between the drawing furnace and cylindrical

body, and downward flows of inert gases. Van Der Giessen does not specifically teach using a first and second gas whereby the thermal conductivity of the second gas (that used in the cylindrical body) is lower than that of the first gas (that used in the drawing furnace).

Okubo JP-11-116264 discloses a first furnace tube for heating and drawing an optical fiber from a preform, and a second furnace tube positioned at the delivery side of the first furnace tube. The first furnace tube contains helium gas and the second furnace tube contains argon gas. Okubu JP 2000-128566 (described above) discloses drawing an optical fiber in a drawing furnace supplied with helium, and thereafter introducing the fiber into a cooling pipe at the outlet of the drawing furnace, with argon fed to the cooling pipe. Both references teach using a second inert gas (argon) with lower conductivity than a first inert gas (helium). Therefore, at the time of the invention, it would have been obvious to one skilled in the art to choose different gases for the drawing furnace and cylindrical body of Van Der Giessen as taught by Okubo for slowing the cooling rate of a drawn optical fiber.

3. Claims 1-9 and 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bailey et al (US 4,396,409) in view of Okubo et al (JP 11-116264 and JP 2000-128566).

Bailey discloses a method of annealing an optical fiber after drawing and before coating. The annealing is performed in an annealing furnace having an inert gas flowing through and having a temperature of 900-1300 degrees C, which overlaps the claimed range of 1200-1700 degrees C. The furnace has a tubular chamber 24, gas inlet pipe 26, and gas outlet pipe 28, thus providing downward flow. The gas may be air or nitrogen. The chamber can also be omitted providing for air to flow naturally through the furnace, thus providing a gas mixing zone between

the two devices. Therefore Bailey discloses the claimed drawing furnace and heating furnace, and operating temperatures for both that read on the claimed ranges.

Bailey does not expressly describe the atmosphere of the drawing furnace and therefore does not teach using a first and second gas whereby the thermal conductivity of the second gas (that used in the annealing furnace) is lower than that of the first gas (that used in the drawing furnace). However at the time of the invention, one of ordinary skill in the art would recognize that drawing of an optical fiber typically takes place in an inert gaseous environment. Okubo JP-11-116264 discloses a first furnace tube for heating and drawing an optical fiber from a preform, and a second furnace tube positioned at the delivery side of the first furnace tube. The first furnace tube contains helium gas and the second furnace tube contains argon gas. Okubu JP 2000-128566 discloses drawing an optical fiber in a drawing furnace supplied with helium, and thereafter introducing the fiber into a cooling pipe at the outlet of the drawing furnace, with argon fed to the cooling pipe. Both references teach using a second inert gas (argon) with lower conductivity than a first inert gas (helium). Therefore, at the time of the invention, it would have been obvious to one skilled in the art to choose different gases for the drawing furnace and cylindrical body of Bailey as taught by Okubo for annealing the drawn optical fiber.

With respect to the arrangement of furnaces in Bailey, the annealing furnace is spaced apart from the exit of the drawing furnace. Therefore, it would be immediately envisioned that gas flowing from the drawing furnace would be discharged before the point where gas is provided to the annealing furnace.

4. Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohga et al (US 5,320,658) in view of Okubo et al (JP 11-116264 and JP 2000-128566).

Ohga discloses a process of drawing an optical fiber prior to coating in which a heating furnace is provided immediately below a drawing furnace. The heating furnace is provided to minimize fiber attenuation resulting from fast cooling. The drawing furnace comprises an inert gas inlet 106 at the top for supplying gas to the drawing furnace, and comprises an outlet at the bottom for passage of the drawn fiber and the gas. A shutter 108 is provided at the bottom of the drawing furnace to maintain the inert atmosphere in the furnace (i.e. keep the interior separated from outside ambient air). The heating furnace comprises a muffle tube kept in an atmosphere of inert gas, oxygen, or hydrogen. The heating furnace is provided with a gas inlet 109 at the top and a gas outlet at the bottom. There also exists a gap between the two furnaces. The temperature within the heating furnace is kept at 500-1500 deg C. Coating device 111 immediately follows the heating furnace. The combination of the drawing furnace and the heating furnace reads on the claimed invention, and the temperatures disclosed by Ohga read on the claimed temperature ranges. As far as the gases used in each furnace, Ohga is silent to any specific combination, but says that any gas such as the ones given above may be used. Thus, the combination of gases used in the two furnaces is a choice depending on the desired operation conditions.

Okubo JP-11-116264 discloses a first furnace tube for heating and drawing an optical fiber from a preform, and a second furnace tube positioned at the delivery side of the first furnace tube. The first furnace tube contains helium gas and the second furnace tube contains argon gas. Okubu JP 2000-128566 discloses drawing an optical fiber in a drawing furnace

supplied with helium, and thereafter introducing the fiber into a cooling pipe at the outlet of the drawing furnace, with argon fed to the cooling pipe. Both references teach using a second inert gas (argon) with lower conductivity than a first inert gas (helium). Therefore, at the time of the invention, it would have been obvious to one skilled in the art to choose different gases for the drawing furnace and cylindrical body of Ohga as taught by Okubo for slowing the cooling rate of a drawn optical fiber and for minimizing fiber attenuation. Since then at the time of the invention, it would have been obvious to one skilled in the art to provide two different gases having different thermal conductivity thereby providing slow cooling and minimizing fiber attenuation.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Blankenship et al (US 5,059,229) discloses drawing an optical fiber in a furnace having a hydrogen-containing atmosphere. Inert gas can be flowed into the bottom portion of the furnace to remove the hydrogen gas before exposure to air.

Lysson et al (US 5,897,681) discloses drawing an optical fiber in a furnace provided with an increasing amount of helium gas in the drawing direction. Helium is drawn through port 17 located near the bottom of the furnace to add to the amount of helium provided at port 13 at the top of the furnace.

Lysson et al (US 5,545,246) discloses drawing an optical fiber in a furnace having a protective gas surrounding the preform and an additional flushing gas provided at the drawing portion of the furnace.

JP-61-097143 discloses a gap between a drawing furnace and a slow cooling furnace

EP 0 321 182 discloses typical drawing furnace and cooling area temperatures.

Guenot et al (US 6,576,164) discloses a method of drawing and cooling an optical fiber in an apparatus comprising a fast cooling region, one that cools the fiber faster than surrounding air, and comprising a slow cooling region, one that cools the fiber slower than by cooling in surrounding air. The slow cooling region follows the fast cooling region, and in the intermediate area between the two cooling stages the temperature is in the range of 1200-1700 deg C.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric Hug whose telephone number is 703 308-1980. The examiner can normally be reached on Monday through Friday, 9:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 703 308-1164. The fax phone number for the organization where this application or proceeding is assigned is 703 872-9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308-0651.

jeh

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